

Letter from Alexander Graham Bell to Mabel Hubbard Bell, May 24, 1893, with transcript

ALEXANDER GRAHAM BELL TO MABEL (Hubbard) BELL Beinn Bhreagh, C. B. Wed. May 24, 1893. The Queen's birthday. My darling Mabel:

In spite of good resolutions to write every day — here is Wednesday and I have not written to you since Sunday. I shall have simply to keep my journal — or diary — or note-book — upon B. B. paper and head my notes with “Dear Mabel” for letters.

Three notes received from you — and this morning note from Mr. McCurdy enclosing Gallaudet's of May 18th.

Suppose Mr. Hubbard will reply to Gallaudet's note — Please ask him to send copy of reply to me here. I am surprised that no letter has yet reached me from Dr. Noyes containing correspondence of Committee on classification.

What am I to do with two packages of thread I found at Bellevue? Shall I give them to Sewing Class? — I await instructions. Miss McCurdy and her father drove here this afternoon. Hope to see them tomorrow — no special news.

Mr. McInnis, Mr. Ellie and I have at last decided on a location for a reservoir to supply the Point House with water. We have found no difficulty in ascertaining its elevation by means of the levelling device I invented a year or two ago. Two glass tubes connected by rubber piping — whole thing filled with water. Water in each glass tube stands at same level.

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Then if water at A stands at a height of 10 inches while water at B stands at 24 inches: — The difference of these readings (take 10 from 24 gives the height of A above B (14 inches). Keeping pipe at A still — pipe was removed from B and carried up hill to another

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point (say C). Difference of readings then gave height of C above A and etc., etc., In this successive readings was taken from a stake near the house at the Point — right up to the site of the proposed reservoir.

The following were the observations:

Observation Height of water in lower tube highest tube. Difference inches inches inches 1. 54.00 6.25 47.75 2. 56.00 5.25 50.75 3. 41.25 4.75 36.50 4. 62.25 4.50 etc., 5. 75.00 3.00 " 6. 60.75 4.00 " 7. 63.25 4.00 " 8. 71.75 3.25 " 9. 66.75 3.25 " 10. 61.00 3.50 " 11 69.50 3.00 " 12 80.00 11.50 " 13 77.00 5.25 " 14 74.75 3.75 " 15 61.25 7.50 " 16 63.75 4.50 " 17 68.00 2.75 " 18 71.00 7.00 " Totals. 1177.25 87.00 1090.25 3

Total height = 1090.25 inches or 90.85 feet. After taking level of our first stake on the house itself, Mr. McInnis found that top of house about 30 feet above stake, so level of reservoir will be about 60 feet higher than the top of house.

Then starting from reservoir we ran a line towards the McNeil gulch nearly level — making only a slight rise of a few inches every fifty feet. (Our rubber tube is 50 feet in length.)

This survey has shown the great value of my levelling device — no necessity to cut down bushes or trees. We went along smoothly and successfully through woods and bushes — just as though it were open ground. Instead of noting the height of the water in each tube — we formed it simplest to note the difference of the two readings. This at once gave us the difference of height between the two points and we went along gradually crawling upwards so as to be sure that the line staked off could be used as a trench to supply water to reservoir.

Mr. Ellis, Mr. McInnis and I spent Monday afternoon tracing this line on mountain side from reservoir towards McNeil gulch. We reached a point beyond the graveyard and near Mr. McInnis' cottage by dusk. I have not yet recovered from fatigue of Monday's work! Tuesday every muscle in my body was aching from the unwanted exercise taken on Sunday and Monday. Wednesday muscles still sore. Let Mr. McInnis and Mr. Ellis finish the survey while I attended to matters concerning sheep. The survey was completed this

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evening — and the point reached on the McNeil gulch has been permanently marked for identification!

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It is much lower in the gulch than I had imagined. The observation seem to indicate that the point reached is about 28 feet higher than the reservoir. The stream could be tapped at least 100 feet higher up — and water obtained in quantity. The distance is very great however — about four thousand feet (4000) to the reservoir. ($\frac{1}{4}$ of a mile). A trench run on this line from reservoir would collect considerable water without being run very far. If the quantity obtained was insufficient the trench could be continued tapping springs of greater volume — and if carried as far as McNeil gulch would collect water in such quantity that it could be used for power at the Point — or at any intermediate place — as well as for irrigation purposes whenever desirable.

Distance of reservoir from house is 750 feet. This would require a pipe at least 4 inches diameter. Head would be 60 feet higher than top of house.

Water could be carried to reservoir in an open drain four feet deep. Even if this froze in winter — flow of water would go on below.

Of course drain could be covered in — or pipes could be laid — but this would increase expense — with perhaps but little corresponding benefit.

Heights of successive points of proposed trench from reservoir. Ask Mr. McCurdy to add up totals.

5 Monday's observations. Wednesdays observations. A.G.B. Mr. Ellis and Mr. McInnis—
Mr. Ellis, Mr. McInnis and Murdock. 5.00 inches 5.50 inches 9.00 inches 7.00 inches 5.00
8.75 6.50 9.00 1.50 6.00 8.25 7.75 5.00 6.00 7.50 8.25 1.00 4.75 7.75 6.00 4.50 9.00 4.50
7.00 5.50 9.00 5.25 10.25 2.50 4.50 7.50 7.25 5.25 6.00 4.00 9.75 5.00 3.75 5.00 7.00
5.25 7.00 10.50 5.00 5.25 4.00 5.50 9.75 4.50 6.75 8.00 10.25 4.00 4.00 5.50 6.50 6.00
8.00 9.50 8.50 6.75 7.00 9.00 10.00 3.50 6.75 5.25 7.00 2.50 7.25 7.50 10.00 2.75 4.25
7.00 7.00 5.50 5.50 5.50 7.00 10.00 9.00 3.25 5.00 7.50 6.50 7.50 5.75 12.00 8.25 5.50

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16.00 9.50 8.00 9.00 9.50 8.50 131.00 inches 164.00 in. 201.25 in. 153.25 in. or 10.92 feet
Mr. Ellis makes this total come to 16.875 feet.

Taking these figures the height of the marked point on the McNeil gulch — above the reservoir is about 25 feet.

Cannot trust myself to add up these columns tonight. Ask Mr. McCurdy to do so and put totals in proper places.

Our experiment survey has shown the great value of my levelling apparatus.

After correcting a few weak points I will patent the 6 apparatus as I have no doubt it will prove to be as valuable to others as it is to me.

I can do my own surveying now — without having to employ surveyors. I feel that the levels determined by my apparatus are more reliable than those taken in the ordinary manner.

Water will find its own level — and by a tube this level can be carried from point to point with great accuracy. The new apparatus will consist of a glass tube 6 feet long enclosed in a split brass tube — carrying graduation marks. The lower end of glass tube will connect with brass elbow pipe by rubber tube.

Or still better — let rubber tube carry a brass elbow inside itself to prevent collapse at the right angled part.

No — first plan better — as brass elbow can be soldered to brass part of apparatus — and form rest for end of glass tube. Pointed end below all very well for soft ground but how about rock. Point can be removed and flat and alone used — or arrangement can be supported on a tripod stand.

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Upper end of tube normally open but advisable to provide it with automatic valve to close when water reaches too high.

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Good gracious! Is this a letter or is it not? Goodnight my darling — pleasant dreams.

By the bye, your Washahachet property looks as if it is on fire. Great smoke there.

Tell Daisy that Mr. Campbell's daughters have collected several hundreds of large mussel shells for her — and they are hard at work cleaning them. They are really beautiful. Mother of pearl iridescent. Some of the shells seem to contain pearls — very small ones — like head of a pin.

With much love.

Your affectionate husband, Alec. Mrs. A. Graham Bell, 1331 Conn. Ave., Washington, D. C.